Entergy

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October 25, 2007
BVY 07-073

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Subject: **Vermont Yankee Nuclear Power Station**
License No. DPR-28 (Docket No. 50-271)
Reportable Occurrence Number: LER 2007-003-00

Dear Sir or Madam,

As defined by 10 CFR 50.73(a)(2)(iv)(A), we are submitting the attached revised Licensee Event Report, LER 2007-003-00, for a Reportable Occurrence that was discovered on August 30, 2007.

There are no regulatory commitments contained within this correspondence.

If there are any questions regarding this letter please contact Mr. David Mannai at (802) 258-5422.

Sincerely,

for TAS.

Ted A. Sullivan
Site Vice President
Vermont Yankee Nuclear Power Station

cc: (next page)

IE22
NRR

cc: Mr. Samuel J. Collins
Regional Administrator, Region 1
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406-1415

Mr. James S. Kim, Project Manager
U.S. Nuclear Regulatory Commission
Mail Stop O8C2A
Washington, DC 20555

USNRC Resident Inspector
Entergy Nuclear Vermont Yankee, LLC
P.O. Box 157
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Mr. David O'Brien, Commissioner
VT Department of Public Service
112 State Street – Drawer 20
Montpelier, Vermont 05620-2601

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
VERMONT YANKEE NUCLEAR POWER STATION (VY)	05000 271	1 OF 3

4. TITLE Reactor Trip Caused by Turbine Stop Valve Closure due to Inadequate Preventative Maintenance

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	30	2007	2007	- 003 -	00	10	25	2007	N/A	
									FACILITY NAME	DOCKET NUMBER
									N/A	

9. OPERATING MODE

N

10. POWER LEVEL

62

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☑ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

CONTACT NAME	TELEPHONE NUMBER *(Include Area Code)*
William F. Maguire, General Manager Plant Operations	(802) 257-7711

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
E	JC	ISV	G080	YES	N/A				

14. SUPPLEMENTAL REPORT EXPECTED

○ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ◉ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On 08/30/07, with the reactor at approximately 62 percent power, a reactor trip occurred due to at least three of the four Turbine Stop Valves (TSV) going greater than 10% closed. This condition actuated the Reactor Protection System (RPS) logic which shutdown the reactor as designed. The reactor trip was attributed to the lack of preventative maintenance on the number 2 TSV Bell Crank Mechanism. Binding in the Bell Crank Mechanism resulted in the number 2 TSV failing to open after a closure test. When the mechanism was freed, the valve opened rapidly causing a rapid pressure change in the TSV actuator hydraulic oil system that resulted in all four TSVs going closed. The appropriate initial NRC notifications were made per 10CFR50.72 (b)(2)(iv)(B) and 10CFR50.72 (b)(3)(iv)(A). Plant safety system response was as expected and the plant automatically shutdown. No release of radioactivity or personnel injury occurred as a result of this event. No similar events have occurred in the last 5 years. This event is reportable as a Licensee Event Report per 10CFR50.73(a)(2)(iv)(A) as an event that resulted in the automatic actuation of systems identified in 10CFR50.73(a)(2)(iv)(B).

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
VERMONT YANKEE NUCLEAR POWER STATION (VY)	05000 271	2007	-- 003	-- 00	2 OF 3

NARRATIVE

DESCRIPTION

The Turbine Stop Valves (TSVs) are functionally tested at least every three months in accordance with Technical Specifications Section 4.1 "Reactor Protection System" (RPS) (EIIS= JC) Table 4.1.1 "Scram Instrumentation and Logic System Functional Tests." The TSV closure signal inputs to the RPS are from limit switches mounted on the four TSVs. Each of the switches is arranged to open before the valve is more than 10% closed to provide an early positive indication of valve closure. The logic is arranged so that closure of any three or more valves initiates an automatic plant shutdown.

The TSVs are equipped with an oil system that hydraulically controls valve operation. Should the TSVs receive an RPS signal to close the oil is ported off the underside of all four TSVs actuators and the valves close rapidly.

On 08/29/07 at 14:16 hours, operators commenced functional testing of the four TSVs. Each of the four TSVs is functionally tested on an individual bases.

On 8/29/07 at 14:24 hours, TSV-2 was cycled closed and when the control switch was placed in normal (open), TSV-2 failed to open. Associated relays de-energized upon closure and remained de-energized as expected. Troubleshooting plans were developed in accordance with Entergy procedures. Entergy assembled a team of experts on turbine control systems that included inhouse, fleet and vendor (General Electric) personnel to develop a troubleshooting plan. Due to the potential consequences of the condition (i.e., reactor shutdown) the activity received the highest level of scrutiny and oversight in accordance with the troubleshooting procedure.

TSV-2, unlike the other three TSVs, is designed with an internal pilot to allow turbine chest warming and pressurization of the below seat areas of the TSV which is necessary for equalizing the pressure across the valves prior to opening the TSVs on a plant startup. This is accomplished by a Bypass Control Mechanism that consists of an articulating lever that operates an oil pilot cylinder that supplies oil to the underside of a piston that opens TSV-2. TSV-2 opens when oil pressure exceeds closing spring pressure. The articulated lever is controlled by a Bell Crank Mechanism driven by an electric motor. When TSV-2 reaches a preset open position, air is removed from blocking valves that allows pilot valves to supply operating oil to TSVs 1, 3 and 4 allowing them to open.

On 08/30/07 at 12:18 hours, the troubleshooting team entered the Turbine Building to inspect, lubricate and mechanically assist the TSV-2 mechanical linkage. This effort was successful and the valve stroked open, and indicated full open from the control room. Upon a subsequent retest, TSV-2 was stroked closed and failed to open.

On 08/30/07, a second troubleshooting plan was developed and the troubleshooting team again attempted to lubricate and free the linkage. At 15:12 the linkage was freed and TSV-2 stroked open faster than expected. This resulted in a pressure perturbation in the TSV actuator hydraulic oil system that resulted in the oil dump valves opening and consequently all four TSVs going closed. This condition actuated the Reactor Protection System (RPS)(EIIS=JC) logic which shutdown the reactor as designed.

All control rods inserted into the core. Reactor water level decreased below 127 inches which caused isolation of Primary Containment Isolation System (EIIS= JM) groups 2, 3, 4 and 5 as expected.

The appropriate initial NRC notifications were made per 10CFR50.72 (b)(2)(iv)(B) and 10CFR50.72 (b)(3)(iv)(A). This event is reportable as a Licensee Event report per 10CFR50.73(a)(2)(iv)(A) as an event that resulted in the automatic actuation of systems identified in 10CFR50.73(a)(2)(iv)(B).

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VERMONT YANKEE NUCLEAR POWER STATION (VY)	05000 271	2007	-- 003	-- 00	3 OF 3

NARRATIVE

CAUSE

Root Cause:

The reactor trip was attributed to the lack of adequate preventative maintenance on the TSV Bell Crank Mechanism. There was no preventive maintenance activity to inspect, rebuild and lubricate the Bell Crank Mechanism on a periodic basis.

ASSESSMENT OF SAFETY CONSEQUENCES

The safety objective of the RPS is to provide timely protection at the onset of conditions that could challenge the integrity of the fuel barrier and nuclear system process barriers. The RPS prevents the release of radioactive material from the fuel and nuclear system process barriers by terminating excessive temperature and pressure increases through the initiation of an automatic plant shutdown. The TSV closure signal inputs to the RPS are from limit switches mounted on the four TSVs. Each of the switches is arranged to open before the valve is more than 10% closed to provide an early positive indication of valve closure. The logic is arranged so that closure of any three or more valves initiates an automatic plant shutdown. For this event, all four valves closed and the RPS and plant safety systems functioned as designed. Plant safety analyses includes analyses of events that bound the experienced automatic shutdown and demonstrate that fuel and nuclear system process barriers remain intact. Consequently, the event did not have an adverse impact on the health and safety of the public.

CORRECTIVE ACTIONS

Immediate Actions

1) Notified the NRC per 10CFR50.72(b)(2)(iv)(B) and 10CFR50.72 (b)(3)(iv)(A).

2) Troubleshot and corrected failure of TSV-2 to open.

3) Lubricated and tested the TSV-2 Bypass Control Mechanism.

4) Completed post trip report prior to resuming plant operation.

Corrective Actions to Prevent Recurrence (CAPR)

1) Create a preventative maintenance activity to rebuild the Bypass Control Mechanism at the same interval as other turbine valve maintenance.

Long Term Corrective Actions

1) Lubricate TSV-2 Bypass Control Mechanism Bell Crank on a periodic basis until refurbishment during Refuel Outage (RFO 27) (scheduled for fall of 2008).

2) Inspect, rebuild, refurbish and lubricate the TSV-2 Bell Crank and Bypass Control Mechanism during RFO 27.

3) Evaluate TSV vendor testing recommendations and determine the appropriate testing frequencies.

ADDITIONAL INFORMATION

No similar events where a reactor trip was caused by turbine stop valve closure have occurred at VY within the past five years.